DOCUMENT RESUME

ED 136 612 FL 008 487

AUTHOR Menyuk, Paula
TITLE Development of Syntax: The Bridge between Meaning and Sound.
PUB DATE Nov 76
NOTE 34p.; Paper presented at the International Symposium on Child Language Acquisition (Acapulco, Mexico, November 12-16, 1976)

EDRS PRICE MF-$0.83 HC-$2.06 Plus Postage.
DESCRIPTORS Articulation (Speech); *Child Language; *Cognitive Processes; *Comprehension Development; *Language Development; *Language Handicaps; Language Research; Linguistic Theory; Memory; Phonology; Psycholinguistics; Semantics; Sentence Structure; Social Factors; Social Influences; *Syntax

ABSTRACT

In this paper early and later development of knowledge of syntactic structures and this development in language-disordered children are reviewed. Theories that have been presented to account for syntactic development (cognitive, cognitive-semantic and social-environmental) are discussed. Early developmental data indicate that there is not a semantic and then, later, a syntactic stage. As children acquire the meaning of a linguistic relation they simultaneously form hypotheses about the syntactic rules used to express this meaning. Abilities which play the most important role in development of comprehension of syntactic structures are the following: to process increasing amounts of parallel temporal-acoustic linguistic information and situational information, to form hypotheses about structures represented in this information, and to hold information in short-term memory so that it can be decomposed by retrieval of structures from long-term memory. The production of utterances, in addition, requires the programming of this parallel information into articulatory movements. Thus, differing language disorders are a reflection of varying degrees of difficulty in these abilities. Social-environmental factors can enhance or retard development, and, to some extent, compensate for differences from the norm in these abilities. (Author)

****
* Documents acquired by ERIC include many informal unpublished *
* materials not available from other sources. ERIC makes every effort *
* to obtain the best copy available. Nevertheless, items of marginal *
* reproducibility are often encountered and this affects the quality *
* of the microfiche and hardcopy reproductions ERIC makes available *
* via the ERIC Document Reproduction Service (EDRS). EDRS is not *
* responsible for the quality of the original document. Reproductions *
* supplied by EDRS are the best that can be made from the original. *
****

ED136612

DEVELOPMENT OF SYNTAX: THE BRIDGE BETWEEN MEANING AND SOUND *

Paula Menyuk

Boston University

765 Commonwealth Avenue

Boston, Massachusetts 02215

U S DEPARTMENT OF HEALTH, EDUCATION & WELFARE
NATIONAL INSTITUTE OF EDUCATION

THIS DOCUMENT HAS BEEN REPRODUCED EXACTLY AS RECEIVED FROM THE PERSON OR ORGANIZATION ORIGINATING IT. POINTS OF VIEW OR OPINIONS STATED DO NOT NECESSARILY REPRESENT OFFICIAL NATIONAL INSTITUTE OF EDUCATION POSITION OR POLICY

"PERMISSION TO REPRODUCE THIS COPYRIGHTED MATERIAL HAS BEEN GRANTED BY
Paula Menyuk
TO ERIC AND ORGANIZATIONS OPERATING UNDER AGREEMENTS WITH THE NATIONAL INSTITUTE OF EDUCATION. FURTHER REPRODUCTION OUTSIDE THE ERIC SYSTEM REQUIRES PERMISSION OF THE COPYRIGHT OWNER."

*Paper to be presented at International Symposium on Child Language Acquisition, Acapulco, Mexico, November 12-16, 1976.

FL008487

In the description of language structure, syntax is that aspect of language which forms the bridge between the intentions and meaning the speaker wishes to express, and how, through the speech signal, these intentions and meanings are realized. Although languages differ in the way they mark the basic relationships of who did what to whom (or what), when, where and how, all languages have rules for encoding these relationships. The task of the child is one of determining how his/her language does so. In this paper I will attempt to briefly review the data concerning the maturation of these abilities, the explanations that have been presented to account for this maturation, and the data on these developments in children with language disorders. I wish to pinpoint those issues which seem most germane to achieving a better understanding of the language development of children with language problems. I will be referring, primarily, to American English, but will, occasionally, discuss the data obtained from children in other linguistic communities to test the notion of universality in the development of this aspect of language.

Early Normal Development of Syntactic Structures

Greenberg (1966) suggests that the languages of the world are consistent in their ordering typologies. Thus, some languages are pre-positional. In terms of basic relations (who did what to whom) the three typical orderings available are SVO, VSO and SOV. VSO and SVO languages are pre-positional and SOV languages are

post-positional. If the language is pre-positional, as in English, it follows that determiners of the noun phrase (quantifiers, adjectives, possessor of the possessed, etc.) precede the noun, and prepositions are used to mark some case relationships, (dative, instrumental etc.). In post-position languages the inverse occurs. Determiners of the noun phrase follow the noun, and endings are added to the noun to indicate case relationships. In VSO and SVO languages the auxiliary verbs precede the main verb and markers of time, cause and purpose follow the main verb.

It has been suggested by Greenberg that these so-called "universals" in the ordering typologies of languages exist because of the nature of the human. First, the order of elements in language reflect the human being's perception of the environment in terms of physical experience or knowledge. Second, these ordering typologies reflect the perceptual capacities and constraints of the human in acquiring and processing language. These constraints bring about a need to have some regularity in ordering so that psychological generalizations can take place. There is also a need to have those elements which modify a central element closer to that element than others which are satellite to it. Rules of ordering of basic elements in utterances (S, V, O; determiner + noun, auxiliary + verb, noun + case, etc.), in accordance with those of a particular language, are the first syntactic acquisitions that take place.

There are two questions that might arise given Greenberg's reasons for the universal ordering typologies in human language. The first is: does the acquisition of word order rules reflect semantic knowledge or syntactic knowledge? The second is: does the acquisition of word order rules reflect cognitive knowledge or linguistic knowledge? At present, using the same body of data; that is, the one and two word utterances of children from different linguistic environments, different theoretical positions appear to have been taken by various researchers. There are those that hypothesize that cognitive and semantic knowledge are one, with semantic knowledge as a sub-set of cognitive knowledge, and preceding syntactic knowledge. (for example, Schlesinger, 1974). Others hypothesize that cognitive knowledge is a prerequisite to semantic knowledge. Semantic knowledge precedes syntactic knowledge, but both structurizations are separate developments from cognitive knowledge (for example, Bloom, 1973). Still others suggest that cognitive knowledge and linguistic knowledge are separate processes and that syntactic and semantic knowledge (i.e. semantax) are inseparable (for example, Fodor et al, 1967). The above theoretical descriptions do not include all the possibilities.. For example, it has been suggested that pragmatic linguistic knowledge (how to demand, state,request, etc.) is learned before semantic and syntactic categories and relations are learned, and that structural knowledge stems from pragmatics (for example, Searle, 1972). Still another possibility

is that non-linguistic and linguistic organizations of categories and relations of categories, given in physical experience, develop simultaneously, and are used in conjunction in communicative interaction (for example, Menyuk, 1975a).

Let us now examine the evidence that is used to come to these varying conclusions. These periods have been observed in language production over the first two years of life. First communicative vocalization and babbling, then single "word" approximations, then single standard "word" utterances, then sequential single word utterances, then two word utterances and finally three word utterances are produced. Although there are exceptions, this is the sequence of development observed with most children throughout the world. The communicative vocalizations that occur before the standard lexicon begins to be acquired contain CV or VC sequences that are marked with different intonational patterns, and these patterns are applied to word approximations, then to standard lexical items, and then to sequential one and two word utterances (Branigan, 1976). What I am suggesting is that there is a great deal of continuity betweem periods in language production and that, as new knowledge is acquired, old knowledge is applied to increasingly more complex or larger domains.

The babbled utterances, marked by intonation and stress, convey demands, statements and requests as well as affective state. The word approximations and words convey the above plus

questions and an aspect of a relation between agents, actions and objects and their state. Sequences of single words, that is two words separated by a pause, convey the above plus two aspects of a relation. Two words without a pause between them convey the above. Three or move word utterances convey similar intents plus various forms of S, V, O relations. Greenfield et al (1972) have hypothesized that over the one word period there is a development of expression of relations. Because of production constraints only one aspect of a topic + comment relation is produced, but the situational context implies that a relation was intended. Table I lists what appear to me to be the functions of the relations described by Greenfield et al during the one word period in the order in which they appear. It is hypothesized that the same relations appear in the same sequence during the sequential one word period except that the two aspects of the relation are now expressed (for example, action + object) and that all relations are present during the two word period.

INSET TABLE I ABOUT HERE

One would assume, given the data on language development, that perception of various linguistic categories and relations precedes production. Therefore, it is possible but, thus far, merely suggested by some experimental data, that the language production of the child is only a minimal representation of his/her perception of linguistic categories and relations.

Although the studies of comprehension of relations during these early periods have been quite limited in number, as compared to studies of production of relations, they,nevertheless, indicate that comprehension precedes production. Thus, when the child is primarily producing only one word utterances there is evidence that appropriate responses occur not only to single words but also to two word utterances which describe, at least, action-object relations, and that children producing primarily two word utterances respond appropriately more frequently to well formed imperatives than they do to single and two word utterances (Shipley, Smith and Gleitman, 1969). There is also evidence that children label as "silly" utterances that express action-object relations in an incorrect order ("Ball bring" or "Ball me the bring."). However, if they attempt to correct such reverse order sentences they do so by adding to or changing the meaning of the sentence rather than by simply reversing order (Gleitman, Gleitman and Shipley, 1972).

In an experiment examining children's ability to act out SVO relations it was found that children at primarily the one word stage did not attend to word order and acted out <u>reversible</u> active sentences ("Boy kiss girl.") randomly (that is, either the subject or object of the sentence was made the subject). However, objects were never made subjects in non-reversible sentences ("Boy throw ball."). At the stage at which two word utterances were being primarily produced, word order in both

types of sentences was observed. (DeVilliers and DeVilliers, 1974). This data indicated to the experimenters that comprehension exceeds production of relations in sentences, and that semantic constraints operate in sentence interpretation before syntactic constraints. It should be noticed, however, that a three part relation is involved in the sentences given for interpretation.

A study was carried out in which children who were at primarily the one word utterance stage were asked to carry out actions in accordance with utterances that were deemed to be both familiar and unfamiliar (for example, "tickle duck" and "tickle car".) to parcel out whether or not children at this stage would attend to the utterances themselves rather than simply rely on ordinary contextual situations for interpretation. (Sachs and Truswell, 1976). In these utterances, state the experimenters, syntactic knowledge was not required, only knowledge of the meaning of lexical items and the semantic relation action-object. Significantly more responses occurred that were related to the utterances than those that were not (70% vs. 30%). Of those percentage of responses that occurred which were related to the utterances, significantly more were correct than incorrect (57% vs. 13%). In addition, in some informal testing, it was found that some of the children responded appropriately when the order of words were reversed. That is, they responded correctly to, for example, both"kiss Teddy" and "Teddy kiss". It should be noticed that unlike the previous study cited, these utterances describe only

a two part , not a three part, relation (action + object with agent understood as self, or agent + action).

Finally, a study was carried out examining children's comprehension and production of relations when they were primarily producing sequential one word utterances. (Horgan, 1976). A range of relations were expressed in their successive one word utterances which were, for the most part, correctly ordered, and a range involving S, V and O were comprehended in a picture identification task. Indeed, there was no substantive difference in the relations produced during the sequential one word utterance period and those found to be produced at the two word period.

These data have bearing on one of the questions posed previously: does semantic knowledge precede syntactic knowledge? Clearly the child understands more aspects of the utterances that he hears than he produces, as indicated in the experimental tests of comprehension, and not simply by interpretation of performance in contexts. The suggestion made is that what he knows initially about the language is semantic and not syntactic. What he/she appears to know semantically are some aspects of the meaning of some lexical items (obviously, not all the properties of the lexical items) and relations described by some of the main constituents in the utterances, and the communicative intent of the utterances (to state, negate, affirm, question, command, request). If, however, comprehension precedes production, then

it might be the case that while the child is producing primarily one word utterances he understands relations of main constituents in the utterances heard plus some basic ordering rules in two part relations (action-object, ~~action~~ actor-action, as indicated in the Sachs and Truswell study). While he/she produces sequential single word utterances he/she understands some further relations, and rules of ordering of main constituents which involve some three part relations (~~action~~ actor-action-object; attribute+noun; possessor+possessed, etc. , as indicated in the Horgan study). This hypothetical order of development in comprehension and production is indicated in Table II.

INSERT TABLE II ABOUT HERE

If the above hypothesized order is correct, then it is a misconception to talk of semantic development first (over the one and early two word period) and syntactic development later (over the later two word and three or more word period) as if they were mutually exclusive developments. The data obtained in the studies discussed indicate that as the meaning (semantics) of particular relations are understood, this understanding is related to the forms (syntax) in which the relation is expressed. It would then be reasonable to talk about semantax development of particular structures over time. In summary, the data obtained thus far does not indicate a semantic and then a syntactic stage, but, rather, an interaction of knowledge to understand and communicate about particular relations. The relations understood and expressed

change in time as the child matures, as does the skill to express these relations. Thus, relations understood at the time the child is primarily producing one word utterances are reflected in the utterances produced during the sequential one word utterance period, and are more substantially represented (there are differences in frequency of occurrence of various relations but apparently not in the range of relations) during the two word utterance period.

Experimental data is needed to more adequately examine this proposed interaction between semantics and syntax. A careful study of the range of what is and what is not understood is a first requirement. However, it should be kept in mind that processing strategies used in both contextual situations and experimental tests might obscure available knowledge. For example, paying attention to last items heard or stressed items (some of the processing strategies discussed by Slobin, 1973) or even transitory topicalized items for a child in a particular situation might obscure the child's knowledge of relations and ordering rules in both naturalistic communicative and experimental situations. Repeated samplings of behavior with an effort made to systematically control for, and manipulate some of the above factors may reduce the uncertainty.

Concerning the second question posed (Is semantax development a reflection of cognitive development?) the answer must, logically, be yes, but the exact nature of this cognitive development needs to be described. It has been proposed by some that certain

cognitive accomplishments must precede certain linguistic accomplishments. For example, it has been suggested that object permanence must precede lexical acquisition and lexical acquisitions of a certain kind (Bloom, 1973; Brown, 1973). However, object permanence as described by Piaget is composed of several sequential developments which involve visual tracking of objects, object identification, visually guided search for hidden objects, visual-motoric search for objects and, finally, resolution of place errors in the search (Bower and Patterson, 1972). In like fashion the production of lexical items to communicate intent appears to be the result of many developmental steps and involves, grossly, discrimination of supra-segmental and segmental speech signal events, comprehension of the communicative intent of speakers as indicated in supra-segments, use of these features to communicate intent, categorization of sequential segmental features as relating to objects and events, and, finally, use of these features to communicate intent about objects and events (Menyuk, 1974).

Acquisition of both performance accomplishments, lexical acquisition and object permanence, are the result of cognitive maturational changes from birth on. Each involves discrimination and categorization of sensory inputs and functional use of these categorizations. Although each final accomplishment appears to be the resolution of somewhat different problems (that is, visual-motor vs. auditory-vocal) each advance in both

accomplishments may be a reflection of similar changes in the organizational abilities of the developing child, and, clearly, there is an interaction of the two knowledge systems in early as well as later communicative acts (Menyuk, 1976a).

Later Syntax Acquisition

What children appear to know about syntax during the course of development of this aspect of the language, and why they know certain things before others have been the subject of many studies. Many of the descriptions of what they know have been based on samples of language production. Again, there are comparatively few studies, but happily more than at the earlier period, of language comprehension. Several factors have been offered as explanations of why they know certain things before others (Menyuk, 1971). It has been suggested that there may be an interaction effect between the factors cited. These are: motivation (what the child wishes to say), input (the forms most frequently heard by the child), and the sequence of acquisition of semantic categories and relations. One might also add phonological acquisition to the list as playing a role in the sequence of forms that are acquired, at least in expressive language, but this is not the topic of this paper. Thus, the sequence of development of syntatic structures is presumably a reflection of these interactional factors. It needs to be stressed, however, that a distinction must be made between syntactic development and language development. It is this aspect of development which these factors are to explain. In addition to the above factors affecting the sequence of development, there is also the question

of the real-time processing abilities of the young child and how these abilities mature. Given the short-term memory constraints of the human organism in its ability to store, analyze and retrieve temporal auditory information, the nature of the structures to be decoded and generated will also affect the sequence in which these structures are understood and produced. After a brief summary of the syntactic developments that take place from approximately 18 months to four years of age, the effect of all these factors will be discussed.

From about 18 months to four years the child achieves the comprehension and use of most of the basic structures in the syntax of the language. This is true of not only American English speaking children but, also, of children speaking some of the many different languages that have been studied (Ferguson and Slobin, 1973). This is not to imply that further development does not take place after four years. It has, however, been a matter of some controversy as to whether or not this further development implies new syntactic knowledge or simply the ability to apply old knowledge to new domains (Menyuk, 1976). As in all aspects of development there are both universals in the sequence of development of structures and individual variation. Many of the children acquiring American English appear to use, at least expressive structures, in the same sequence, but some children do not. Since the samples studied over the early period of this development are so small, and no follow-up studies have been

carried out, the effect of these early differences on later development, if any, have not been determined. The factors cited to account for sequence of development could, theoretically, predict both, at least partial, universal or individual sequences.

By the time the child is producing subject+predicate sentences he/she is also using articles, adjectives, auxiliary verbs, adverbs and prepositions. The ordering of these classes in relation to each other within a sentence is correct, indicating that syntactic classification may bave begun, but is certainly not complete. For example, the syntagmatic shift in word association studies does not occur until approximately age 7. Thus, classification of sub-elements as belonging to the same syntactic category is presumably not complete. However, it is never the case that substitution of one class for another occurs in the sentences produced, or in studies of comprehension of the meaning of sub-elements. What remains to be accomplished is application of this knowledge in a particular processing task, or, in other terms, the development of meta-linguistic abilities concerning segmentation of these sub-elements (Menyuk, 1976c).

In addition to producing well ordered simple active declarative sentences, the child, during this period develops well formed negative and question sentences and the "got" form of the passive. Also, the general and the increasingly specific forms of morphological markers are applied appropriately to indicate tense and number. Most of what remains to be accomplished after

this period is the acquisition of forms particularly specific to strong nouns and verbs, and word derivation rules (primarily suffixing that is not simple addition). Finally, even during the earliest time in this period sentence conjoining and embedding occurs (Menyuk, 1969; Limber, 1973).

Over a short period of time, approximately from 24 to 36 months, a great deal happens to the structure of the SVO utterances produced at the beginning of this period and much of it happens simultaneously. Development takes place in expansion of the noun phrase subject and object, expansion of the verb phrase, use of different sentence types in accordance with the specific rules of the language, and expansion of the sentence. Table III indicates, in somewhat greater detail than the above comments, the development of sentence types by the application of transformations to one sentence, and by the expansion of sentences by conjunction and embedding, in the order that has been observed in sentence production.

INSERT TABLE III ABOUT HERE

Studies of sentence comprehension have varied in terms of the means by which such comprehension has been tested. For example, one such study examined the time needed to confirm the truth or falsity of affirmative and negative, active and passive sentences, in accordance with picture stimuli (Slobin, 1966). It was found

that the time needed to verify the particular sentence structure varied depending on several factors. If subject and object were irreversible ("girl waters flowers") less time was needed than if they were reversible ("dog chases cat"). In general, active sentences took the least time to process and passive negatives took the most time. However, depending on either the truth or falsity of the sentence, either passives took less time than negatives (with true statements) ~~and~~ or negatives took less time than passives with false statements. Thus the congruency of the situation to the sentence played a role in how quickly it could be processed.

In general, studies of children's processing of sentences by having them act out the relations described in the sentence have found that active sentences are processed accurately before passive, cleft, and embedded sentences (for example, Bever, 1970). It has also been found that children will act out irreversible active sentences ("dog pats mother") in accordance with word order rules. This finding adds emphasis to the fact that a particular experimental situation can influence the data obtained. In general, the same order of difficulty obtained from studies of sentence production and reproduction have been obtained in studies of comprehension. Thus sentences which contain more "transformations" or expansions are more difficult to process than those that contain fewer (Menyuk, 1971). Grossly speaking

then, the order of sequence of comprehension and production seems to be quite similar, but only grossly speaking. Because comprehension has been tested in varying ways (picture identification, manipulation of objects) with varying delay times interposed between exposure and recall, and measured in varying ways (response time, accuracy of recall), it may be that experimental factors rather than comprehension ability per-se account for the data obtained. In a recent study (Menyuk, 1976d) it was found that the specific processing constraints (situational, only auditory, auditory-motor, etc.) affected which structures were most easy or difficult to process in each task (imitation, spontaneous production, comprehension, correction). Despite these difficulties in interpretation, these gross similarities in sequence of comprehension and production of syntactic structures exist.

I will review the factors that have been presented to explain the sequence of development, and examine how adequately they account for that sequence. The first is motivation. Outside of the innate motivation (Bell and Ainsworth, 1972) to communicate, which presumably starts the process going, it is difficult to relate motivational factors <u>to sequence</u> of acquisition of varying structures. These factors obviously play a role in the <u>selection</u> of forms from the available repertoire to convey intended meaning, but they do not provide explanations for the sequence of acquisition

itself. For example, why children should be motivated to acquire fully well-formed negative before questins, a sequence that occurs, is certainly not obvious.

The second factor mentioned is input to the child. There are now an increasing number of studies in the literature which indicate 1) there is no direct teaching of various syntactic structures by parents (Brown, 1973), 2) that language used with the child beginning to acquire the grammar of the language is much simpler and more repetitive than the language used to older children (Snow, 1972), and 3) that parents are cued by the language used by the child as to what forms would be most appropriate for them to use (Phillips, 1973; Stein, 1976). These data indicate that although language is simplified by parents in communicative interaction with their very young (or linguistically immature) children, it is still the task of the child to induce the rules of the language from the data being presented to him or her. The data also indicate that the language "models" presented to the child are based on the information received from the child concerning his or her language knowledge. That is, it appears that children cue their parents language behavior rather than vice-versa. A logically possible, but not carefully explored hypothesis from these data is that, having received cues to the fact that certain progress is being made in grammatical development, parents respond by appropriately increasing the sophistication of their input.

The third factor indicated as an explanation of the sequence of grammatical development is that acquisition of semantic categorizations leads to appropriate forms to express these categorizations (Slobin, 1973). Semantic categorizations, as suggested by several researchers, are themselves a reflection of cognitive developments. A classic example given is one of acquisition of tense markers. Notions of time of action, in the sentences produced by American English speaking children, are first marked in terms of ongoing activity (present progressive), then past, then habitual activity (in English third person singular), then future (Menyuk, 1971). The explanation of the above data in terms of progress in the child's understanding of the nature of time (i.e. cognitive development) seems reasonable, but the distinction of semantic categorization before syntactic does not. Again, it seems to be a case of semantax; that is, how to linguistically realize an intended meaning. Further, the cognitive to semantic to syntactic sequence proposed does not account for all aspects of syntactic development. For example, it has been noted that certain lexical items (for example, verbs, prepositions and conjunctive terms) are acquired and appear to be used appropriately in utterances while experimental data indicate that there is an incomplete understanding of the relations implied by these items (Vygotsky, 1962). An example of this is Chomsky's study (1969) of children's understanding of "promise" sentences where, presumably, children both understood the meaning of the verb

and were themselves appropriately using sentences containing "promise". Indeed, it has been suggested but, at least, seriously questioned by Sinclair's study (1969) that acquisition of linguistic categories leads to understanding of non-linguistic organizations. However, these data also imply that discovery of linguistic and non-linguistic organizations appears to occur simultaneously.

The final factor presented to account for the sequence of syntactic development is that of constraints of on-line processing of temporal-acoustic information. If one re-examines the gross outline of sequence of syntactic development, as indicated in Table III, obtained from studies of sentence comprehension and production, two constraints seem to provide an explanation of the sequence. One is the amount of information and the other is the structure of the information. In studies of children's sentence comprehension, recall and production, expansions of noun phrase (determiner+article+...), or verb phrase (have+en+be+ing), or increasing the combination of transformations in an utterance (question+negative; ~~passive~~ passive+negative) causes younger children to reduce the information to main constituents and simpler forms of the sentence, whereas older children more accurately preserve this information. It has also been found in such studies that constructions which introduce information which interrupts the main relations in the sentence, that is, those that do not preserve a contiguous SVO order (as in passives, embedded relatives and complements, cleft sentences) are understood and produced

after those that maintain this order. Such "interrupted" forms occur in phonology and in the relations implied by certain lexical items. In phonology consonant clusters both medially and finally are interruptions of the basic CVC syllabic unit and are initially reduced. Lexical items in certain sentence structures reverse the expected relations and order of events as in "promise" sentences and certain "before" and "after" constructions (Clark, 1971), and are initially interpreted as expressing these expected relations and order of events. In these constructions appropriate analysis cannot take place until the entire sequence has not only been stored, but also ~~received~~ viewed. Thus, information must be held for a longer time and a larger number of alternative possibilities anticipated (Fodor, Bever and Garret, 1974). At the present moment such an explanation seems to most adequately account for the sequence of acquisition of structural knowledge of the language. However, it should be emphasized that it only partially accounts for increasing knowledge of appropriate selection from this store of linguistic knowledge in particular situations. Both aspects of development, knowledge of structure and knowledge of rules of use, are employed in communicative interactions, and develop simultaneously over time. For this development both linguistic and non-linguistic processing in a situation is needed (Menyuk, 1976b).

Syntactic Development in the Language Disordered Child

In the brief description of syntactic development in the normally developing child, the adequacy of linguistic and

cognitive processing and psycho-social factors in explaining progress in this aspect of language development were discussed. The question that arises with language disordered children is which factors will primarily explain these children's retardation and/or deviance in this aspect of development. Elsewhere (Menyuk, 1975b) I have listed those factors that have been cited in the literature to account for the differences in the language development of children with various developmental anomalies (general retardation and specific lesions of the peripheral and central nervous system) and children developing normally. These can be reduced to either explanations which posit a general cognitive deficit (these children do not symbolize) or those which suggest specific processing difficulties in a particular sensory-motor domain. These latter refer primarily to the auditory domain, but I believe this is an incorrect assumption.

Gross descriptions, the only kinds available, of the language development, and/or language performance of children with developmental anomalies indicate that, depending on the neurophysiological-cognitive state of the child, and particular educational experiences, groups of these children plateau for a long period of time at various points along the continuum of oral language development. Thus, some children appear to never acquire communicative vocalization or a standard lexical repertoire, while others achieve a memorized repertoire of set phrases and sentences. Others generate SVO sentences with simple expansions of noun phrase and verb phrases, but never achieve further expansions

of the main constituents of subject, predicate and sentence. Still others generate sentences which appear, on the surface, to be more complex. However, there is reason to believe that they are also memorized set forms (Menyuk, 1975c). Because of these observed differences which appear to involve either distinctiions in amount of information that can be stored and analyzed, and the difference between rule-governed processing versus memorization of stereotyped patterns, it has been suggested that children with developmental anomalies differ amongst themselves both in terms of memory capacity and memory organization, and differ from normally developing children primarily in memory organization (Menyuk, 1976a).

Although the data concerning either the language development or language performance of these children are sparse in comparison to that obtained from normally developing children, I have reached several tentative conclusions about these children's linguistic development and the reasons for it. These tentative conclusions are presented as hypotheses which need to be tested. The first, I believe, would be met with general agreement. A diagnostic categorization does not describe a homogeneous group in terms of language development. That is, the labels of mental retardation, aphasic, cerebral palsied, or autistic or, indeed, blind or severely hearing-impaired do not describe distinct differences in language development among the groups so labelled. Rather, there are distinct differences among the children within

a group and similarities among children across diagnostic groups. These can be accounted for by differences and similarities in neurological substrates, and ~~that~~ these differences and similarities in neurological substrates result in different and/or similar processing difficulties. These, in turn, can either lead to difficulty in comprehension and/or production of both linguistic and non-linguistic orgainizations as a whole or in particular aspects of these developments. Descriptions of the language development of these children as more or less delayed obscure these processing differences among the children, and there is a need to engage children from different diagnostic categories in similar language processing tasks to determine what these processes similarities and differences are. A third tentative conclusion is that both linguistic and non-linguistic organizations are involved. This conclusion is based on both theoretical and experimental grounds. Recent data from dichotic listening tasks with both linguistic and non-linguistic input indicate that there may be differences in the processes the hemispheres become committed to, and not simply differences in the type of input (linguistic vs. non-linguistic data) they are primarily committed to (Bever and Chiarello, 1974). The left hemisphere may be engaged in those tasks which require analysis, whereas the right is concerned with gestalts. In a study of aphasic children's comprehension and recall of varying visual-motor relations of objects in a sequence, and these same relations

as expressed in sentences presented orally, it was found that there was great similarity across tasks in the relations that they had difficulty with, and the types of errors that occurred (Levy and Menyuk, 1975). These data contradict somewhat the notion that these children have a specific language difficulty, but do not suffer from any difficulties in the non-linguistic domain. They also indicate the need to much more carefully explore the concept of similar processing difficulties in both domains of children with developmental anomalies. It is certainly not clear that "performance" and linguistic tasks on standard intelligence tests are analagous, nor that experiments which claim auditory, by not visual, processing difficulty in children with certain developmental anomalies have used analagous tasks in both domains.

In summary, the amount of information and the structure of the information to be processed and/or retrieved, and under what circumstances, will have a varying effect on what is acquired and when by different children given the proposed differences in neurophysiological states. These differences will be reflected in different patterns of language development. Researchers have just begun to explore these questions with these children, but they have at least begun to be explored.

Hopefully, at a conference in celebration of the 30th anniversary of the Mexican Institute for Hearing and Language Disorders, we will have some substantive answers as to which

factors are causing what processing difficulties that result in differing patterns of syntactic development among these children, and between them and children developing normally. We may then have better proposals concerning what to do about it.

TABLE I: Semantic Functions of One Word Utterances in Order of Appearance

1. Imitative Routines
2. Naming
3. Vocatives (calling)
4. Object (of demand)
5. Negation (rejection, denial, non-existence)
6. Performatives
   a. Action of Agent (self, other)
   b. Inanimate Object of Action (of agent, self, other)
   c. Action, State (of inanimate object)
7. Reportatives
   a. Possessor and Habitual Location (of object)
   b. Location (of agent, action, object)
   c. Experience
   d. Agent

TABLE II: Order of Comprehension and Production over Early Periods of Development

Production	Comprehension
1. Babbled Utterances	Some Words and Intent
2. Word Approximations and Words	Ordered Two Part Relations and Intent
3. Sequences of Single Words	Various Relations of S,V,O and Intent
4. Two Word Utterances	The Above Plus Some Expansions of S,V,O and Intent

TABLE III: Development of Sentence Structure

Development of Sentence Type from SVO

1. Expansion of auxiliary/modal
2. Negative attachment
3. Question permutation
4. Negative + Question
5. Passive got
6. Passive got + Negative
7. Passive be
8. Passive be + Negative + Question
9. Indirect object

Expansion of Sentences

1. Conjunction of sentences
2. Conjunction of subjects
3. Right embedding
4. Conjunction of objects
5. Center embedding

References

Bell, S. and Ainsworth, M. 1972. Infant crying and maternal responsiveness. Child Devel., 43, 1171-90

Bever, T. 1970. Cognitive basis for linguistic structure. In Hayes, J. (Ed.) Cognition and Language. New York: John Wiley.

_____ and Chiarello, R. 1974. Cerebral dominance in musicians and non-musicians. Science, August 9, 537-39.

Bloom, L. 1973. One Word at a Time. The Hague: Mouton.

Bower, T. and Paterson, J. 1972. Stages in the development of the object concept. Intl. J. of Cognitive Psychol., 1, 47-55.

Branigan, G. 1976. Sequences of single words as structured units. Paper presented at Child Language Research Forum, Stanford University.

Brown, R. 1973. A First Language: The Early Stages. Cambridge: Harvard U. Press.

Chomsky, C. 1969. The Acquisition of Syntax in Children from 5 to 10. Cambridge: M.I.T. Press.

Clark, E. 1971. On the meaning of before and after. J. Verbal Learning and Verbal Behavior, 10, 266-75.

DeVilliers, J. and DeVilliers, P. 1974. Competence and performance in child language. J. of Child Language, 1, 11-22.

Ferguson, C. and Slobin, D. (Eds.). 1973. Studies of Child Language Development. New York: Holt, Rhinehart and Winston.

Fodor, J., Bever, T. and Garret, M. 1974. The Psychology of Language. New York: McGraw- Hill Book Co.

_____, Jenkins, J. and Saporta, S. 1967. Psycholinguistics and communication. In Dance, F. (Ed.) Human Communication Theory. New York: Holt, Rhinehart and Winston, 160-201.

Gleitman, L., Gleitman, H. and Shipley, E. 1972. The emergence of the child as grammarian. Intl. J. of Cognitive Psychol., 1, 137-64

Greenberg, J. H. 1966. Universals of Language. Cambridge: M.I.T. Press.

Greenfield, P., Smith, J. and Laufer, B. 1972. Communication and the Beginning of Language., Harvard University, forthcoming.

Horgan, D. 1976. Linguistic knowledge at Stage I: evidence from successive single word utterances. Paper presented at Child Language Research Forum, Stanford University.

Levy, C. and Menyuk, P. 1975. Cognitive and linguistic skills of children with normal and deviant language development. Paper presented at meeting of American Speech and Hearing Association, Washington, D.C.

Limber, J. 1973. The genesis of complex sentences. In Moore, T. (Ed.) Cognitive Development and the Acquisition of Language. New York: Academic Press, 169-86.

Menyuk, P. 1976 a. The language of autistic children: what's wrong and why. Paper presented at the Intl. Symposium on Childhood Autism and Schizophrenia, St. Gallen, Switzerland, Aug. 12-1 6, to be published in proceedings.

[illegible], P. 1976 b. Language and Maturation. Boston University, forthcoming.

_____ 1976 c. That's the same, another, funny, awful way of saying it. J. of Education, Boston University, 158, 25-38.

_____ 1976 d. Linguistic problems of children with developmental dysphasia. In Wyke, M. (Ed.) Developmental Dysphasia. London: Academic Press, in press.

_____ 1975 a. The language impaired child: linguistic or cognitive impairment? Annals of the New York Academy of Sciences, 263, 59-69.

_____ 1975 b. Children with language problems: what's the problem? Georgetown University Roundtable on Language and Linguistics, Georgetwon University, 129-44.

_____ 1975 c. Bases of language acquisition: some questions. J. of Autism and Childhood Schizophrenia, 4, 325-[illegible].

_____ 1974. Early development of receptive l[illegible]uage. In Schiefelbusch, R. and Lloyd, L. (Eds.) Language Perspecti[illegible]: Acquisition, Retardation, and Intervention. Baltimore: U. Park Press, 213-36.

_____ 1971. The Acquisition and Development of Language. Englewood Cliffs, New Jersey: Prentice-Hall Inc.

_____ 1969. Sentences Children Use. Cambridge: M.I.T. Press.

Phillips, J. 1973. Syntax and vocabulary of mother's speech to young children. Child Devel., 44, 182-5.

Sachs, J. and Truswell, 1. 1976. Comprehension of two-word instructions by children in the one word stage. Paper presented at the Child Language Research Fo[illegible], Stanford University.

Schlesinger, I. Relati[illegible]l concepts underlying language. In Schiefelbusch, R. and Lloyd, L. (Eds.) Language Perspectives: Acquisition, Retardation, and Intervention. Baltimore: U. Park Press, 129-52.

Searle, J. 1972. Chomsky's revolution in linguistics. The New York Review of Books, June, 1972 16-2424.

Shipley, E., Smith, C. and Gleitman, L. 1969. A study in the acquisition of language. Language, 45, 322-42.

Sinclair de Zwart, H. 1969. Developmental psycholinguistics. In Elkind, D. and Flavell, J. (Eds.) Studies in Cognitive Development. New York: Holt, Rhinehart and Winston, 175-208.

Slobin, D. 1973. Cognitive prerequisites for the development of grammar. In Ferguson, C. and Slobin, D. (Eds.) Studies of Child Language Development. New York: Holt, Rhinehart and Winston, 175-208.

Slobin, D. 1966. Grammatical transformations and sentence comprehension in childhood and adulthood. J. Verbal Learning and Verbal Behavior, 5, 219-27.

Snow, C. 1972. Mother's speech to children learning language. Child Devel., 43, 549-55.

Stein, A. Mothers' and Fathers' Speech to Normal Language and Language Disordered Children. Unpublished Doctoral Dissertation, Boston University, School of Education, 1976.

Vygotsky, L. 1962. Thought and Language. Cambridge: M.I.T. Press.